

Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at http://about.jstor.org/participate-jstor/individuals/early-journal-content.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

V. Multiplication of Large Numbers.

By H. S. Uhler, Yale University.

In a recent number of the Monthly (1921, 114) I gave computations for $e^{\pm \pi}$, $e^{\pm \pi/2}$, $e^{\pm \pi/3}$, $e^{\pm \pi/6}$ to over fifty places of decimals. After mailing the article I set to work to form the product $e^{-\pi}e^{\pi}$, which should approximate to unity. The computation was performed in a single afternoon and evening and resulted in 1 followed by 52 zeros before the appearance of significant figures $3859\cdots$ It seems certain, therefore, that the earlier computations are correct to more than 50 decimal places,—my original tacit goal.

It may be of interest to give an account of the scheme used for multiplying two large numbers in such a manner as to avoid errors.

Buy suitable coördinate paper. Cut up long strips of cardboard about half an inch wide. Lay a strip of cardboard on the coördinate paper so as to write the digits properly spaced. Multiply the multiplicand by one of the nine digits $1, 2, \dots, 9$, one such result to be written on one strip of cardboard; so that nine strips will contain all the partial products to be used. No error can remain on these strips after careful inter-comparison and mutual checking, e.g., $6 = 2 \times 3 = 5 + 1$, etc. Then place a properly spaced copy of the multiplier above and to the right of the large sheet of coördinate paper, and fasten it in position.

Commence with the extreme left-hand digit of the multiplier and select the corresponding strip of cardboard. Place the extreme right-hand digit of the cardboard exactly below or under the left-hand digit of the multiplier and copy on the coördinate sheet the figures on the cardboard. There is no mental work; and the eye cannot miss a single mistake, since each digit copied on the coordinate sheet is directly under the same digit on the cardboard.

Now place the next strip indicated by the multiplier one space lower and one space further to the right, and copy as before. Continue this process for successive figures of the multiplier, omitting unnecessary figures falling beyond the right side of the coördinate sheet.

No error should arise in adding the columns on the coördinate sheet because of repetition and other obvious means of checking. As a matter of fact, I have, as yet, made not a single mistake that I did not detect before proceeding further.

The illustration given shows the actual copy of the coördinate sheet as used for the multiplication of the numbers

¹ The text of this article was adapted by the editor from a private communication of Professor Uhler.—EDITOR.

2 16070 -

```
e^{\pi} = 23.14069\ 26327\ 79269\ 00572\ 90863\ 67948\ 54738\ 02661\ 06242\ 60021\ 16
e^{-\pi} = 0.04321 \ 39182 \ 63772 \ 24977 \ 44177 \ 37171 \ 72801 \ 12757 \ 28109 \ 81063 \ 30854
    8642 78365 27544 49954 88354 74343 45602 25514 56219 62126 61707 00256 2
    1296 41754 79131 67493 23253 21151 51840 33827 18432 94318 99256 05038 43
      43 21391 82637 72249 77441 77371 71728 01127 57281 09810 63308 53501 281
      17 28556 73055 08899 90976 70948 68691 20451 02912 43924 25323 41400 5124
          25928 35095 82633 49864 65064 23030 36806 76543 68658 86379 85121 00769—
          3889 25264 37395 02479 69759 63454 55521 01481 55298 82956 97768 15115+
             86 42783 65275 44499 54883 54743 43456 02255 14562 19621 26617 07003
             25 92835 09582 63349 86465 06423 03036 80676 54368 65886 37985 12101 —
              1 29641 75479 13167 49323 25321 15151 84033 82718 43294 31899 25605
                 8642 78365 27544 49954 88354 74343 45602 25514 56219 62126 61707
                 3024\ 97427\ 84640\ 57484\ 20924\ 16020\ 20960\ 78930\ 09676\ 86744\ 31597 +
                  302 49742 78464 05748 42092 41602 02096 07893 00967 68674 43160
                   38 89252 64373 95024 79697 59634 54555 21014 81552 98829 56978-
                      86427 83652 75444 99548 83547 43434 56022 55145 62196 21266+
                      25928 35095 82633 49864 65064 23030 36806 76543 68658 86380
                       3889 25264 37395 02479 69759 63454 55521 01481 55298 82957 -
                           2 16069 59131 88612 48872 08868 58586 40056 37864 05491-
                             30249 74278 46405 74842 09241 60202 09607 89300 96769-
                               864 27836 52754 44995 48835 47434 34560 22551 45622-
                               388 92526 43739 50247 96975 96345 45552 10148 15530 -
                                 3 45711 34611 01779 98195 34189 73738 24090 20582+
                                   25928 35095 82633 49864 65064 23030 36806 76544 -
                                    1296 41754 79131 67493 23253 21151 51840 33827+
                                     259 28350 95826 33498 64650 64230 30368 06765+
                                      30 24974 27846 40574 84209 24160 20209 60789+
3 88925 26437 39502 47969 75963 45455 52101+
                                          17285 56730 55088 99909 76709 48686 91205
                                           3457 11346 11017 79981 95341 89737 38241-
                                            216 06959 13188 61248 87208 86858 58640
                                             17\ 28556\ 73055\ 08899\ 90976\ 70948\ 68691 +
                                              3 02497 42784 64057 48420 92416 02021-
                                                12964 17547 91316 74932 32532 11515+
                                                 3457 11346 11017 79981 95341 89737+
                                                    8 64278 36527 54449 95488 35474+
2 59283 50958 26334 98646 50642+
                                                       25928 \ 35095 \ 82633 \ 49864 \ 65064 +
                                                         432 13918 26377 22497 74418 -
                                                          25 92835 09582 63349 86465
                                                             86427 83652 75444 99549 -
                                                             17285 56730 55088 99910 --
                                                               864 27836 52754 44995+
                                                               259 28350 95826 33499-
                                                                    8642 78365 27544 + 432 13918 26377 +
                                                                      43 21391 82638 -
                                                                      25 92835 09583 -
                                                                          43213 91826 +
                                                                          30249 74278+
                                                                           2592 83510 -
                                                                            38892526 +
                                                                             30 24974+
```